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ABSTRACT

This paper explores what is meant by "thinking" in a target language. Factors that determine both unplanned and planned use of more than one language for thinking are discussed, and empirical data from a mini-survey and from personal language learning and language using experiences are presented. The role of target-language thinking in improving language ability is reviewed, also from empirical data from the survey and personal experiences. Mental translation in the reading of intermediate college French, the language of thought in an elementary school Spanish immersion program and thought patterns in the production of speech acts by college English as a Foreign Language (EFL) students are also examined. It is concluded that there are definite benefits from making an effort to think in the target language. Actual examples from multilingual subjects are given, and the mini-survey is appended. (Contains 36 references.) (Author/NAV)

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The Role of Language of Thought in Foreign Language Learning

Andrew D. Cohen

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The Role of Language of Thought in Foreign Language Learning[1]

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Methods of foreign language teaching and learning are often predicated on the principle that learners need to think as much as possible in a language that they wish to learn. This paper first explores what it means to think in a target language. Next, those factors which determine both unplanned and planned use of more than one language for thinking are discussed, and empirical data from a mini-survey and from the author's own language learning and language using experiences are presented. Thirdly, the paper considers the role of target-language thinking in improving language ability, again drawing on empirical data from the survey and from the author's experiences. Finally, we will look at mental translation in the reading of intermediate college French, the language of thought in an elementary-school Spanish immersion program, and thought patterns in the production of speech acts by college EFL students. After reviewing the responses from the mini-survey of multilinguals, from the author's own experiences, and from additional empirical studies, the conclusion reached is that there are definite benefits from making an effort to think through the target language. It is suggested that further research may ultimately produce a set of guidelines for learners as to the advantages and disadvantages of thinking through the native language while performing target language tasks.

Is it beneficial for learners to attempt to think as much as possible in a language that they wish to learn or to improve their mastery of? Might it be detrimental to their learning if they limit their use of that language as a vehicle for thought? This issue has not been expressed as a set of research questions until recently, and the intuitively-based assumption has been that the more thinking through the target language, the better. There is evidence from research on foreign-language reading, however, that translation into the native language may play a positive role for

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some, if not many, language learners in the retention and comprehension of written texts (Kern 1994; to be discussed below). Under what circumstances might the more successful language learners think extensively or exclusively in the target language that they are using? While multilinguals may actually have differential strengths in their various languages, according to discourse domain (Selinker & Douglas 1985), the extent to which they use these languages for solving cognitive tasks has remained a relatively unexplored phenomenon.

This paper will: (a) explore what it means to think in a target language (LT), (b) look at results from a mini-survey and from the author's self-examination regarding unplanned and planned use of more than one language for thinking, (c) consider the same empirical data regarding the role of LT thinking in improving language ability, and (d) examine additional empirical findings regarding multilingual thought patterns and the implications of these findings with regard to foreign-language teaching and research.

What it Means to Think in a Target Language

Many language educators would maintain that the best way for learners to achieve native-like control of an LT is to make an effort to think in that language rather to translate or reprocess the material into their first language (the L1) or into some other language which they have learned (the LO). Is this folk wisdom that we need to liberate ourselves from or is it sound advice? This issue will be explored in the paper.

First of all, what does it mean to "think in a target language"? For the purposes of this paper we will concern ourselves only with verbalized thoughts (whether silently, subvocally, or aloud) and not with non-verbal thoughts (images, symbols, etc.). The extent and nature of LT thinking can vary from minimal, passing thoughts (e.g., just a word or two) to more extensive and "deeper" (i.e., more cognitively complex) ones, depending both on the nature and quality of the language learning environment (e.g., an L2 vs. an FL learning situation), and on the degree to which the learner has mastery over the LT. Since there appears to be little or no systematic research in this area, we can only speculate as to the extent to which non-natives' thoughts are in the LT and the effectiveness of "thinking in the LT" as opposed to thinking in the L1[2]

Unless we are thinking out loud, our thoughts reflect inner speech--that is, the thinking we do in our minds that is in the form of words rather than images or symbols. This inner speech could be both self-directed or private in the Vygotskian sense (i.e., not intended for others and perhaps difficult to interpret because it is incomplete in grammatical form and vocabulary but adequate for the thinker) or other-directed or public (i.e., interpretable by others) (Vygotsky 1961). In order for inner speech to take place in an LT, learners may need to attain a certain functional level with

regard to vocabulary and structure. Some areas of thought may be more demanding than others for given learners.

An empirical question is one of threshold: how well do learners need to function in a language in order to think in that language? But since thinking in a language involves different levels or depths of meaning, the answer to the question is complex. We cannot, for example, assume that greater proficiency in a language enhances the possibility that thinking will occur in that language. There need not be a necessary link here since proficiency is probably not a unitary construct in the first place.

It is also reasonable to assume that thinking through the LT is more likely in a discourse domain over which the learner has greater control. It has been hypothesized in the literature that learners create their own highly personal discourse domains (Selinker & Douglas 1985). These domains are "internally-created contexts, within which...interlanguage structures are created differentially" (p. 190). Selinker and Douglas (1985) gave the example of a discourse domain in civil engineering created by a native Spanish-speaking graduate student. They demonstrated in their research how nonnatives may be more conversant in talking about content in certain discourse domains than in others. There is also research which shows that even nonnatives with limited language proficiency may still be more conversant in talking about content within their professional discourse domain than less knowledgeable native speakers (Zuengler 1993).

Another way to characterize thoughts might be through distinguishing those of an academic nature from those of an interpersonal or social nature, consistent with the distinction between academic and conversational language proficiency made by Cummins (1991). If learners wanted to use the LT to think through a word problem in math or refine the research questions for a study, then they would need to call on their academic language proficiency in the LT in order to do so. Likewise, if they wanted to think LT thoughts of a sociocultural nature, possibly even emotionally charged ones (e.g., planning a complex speech act, such as complaining, apologizing, or making a delicate request; or relating an emotional upset to a close friend), then the learners would need the appropriate conversational language proficiency in the LT.

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[2] The possibility is raised that so-called LT thinking may actually consist of little more than "relexified" L1—that is, with LT words replacing L1 words in L1 structures (Jim Lantolf, Personal Communication, May 13, 1994). This is an extreme position. In actuality, the interlanguage reflected by a nonnative's LT thoughts is mediated by experiences, by ethnolinguistic background, by gender, and by the discourse domain. Given that most nonnative users of a language lack full mastery in their productive skills (speaking and writing), it is likely that their LT thoughts will be transmitted though an interlanguage as well. An empirical question would be whether the fact that the LT thoughts are conveyed through an interlanguage might have a deleterious effect on the thoughts themselves.

In certain language contexts, such as that of the workplace, both nonnative learners and bilinguals who have the LT as one of their languages, may only be able to perform work-related cognitive operations in that LT (e.g., in scrutinizing the language of a legal document or of a patient's medical record, in negotiating an auto repair, or in functioning successfully in an academic discipline such as psycholinguistics). They may not know how to think about work-related issues in their L1 if their only exposure to the material (e.g., through schooling and/or through a work experience) is in the LT, and if, in addition, they have done little or no reprocessing of this LT material into the L1 or another language. In other domains, such as that of social interaction, the language of thought in social interaction may be the L1 or an LO in which the speaker feels more comfortable. Hence, we could consider this a case of diglossic thinking where the speaker has the capability of thinking in two or more languages and uses these languages for distinctive and largely complementary purposes.[3]

Recently, a sociolinguistic survey was conducted to determine what was referred to as "the internal functions" of language for 59 bilingual students and teachers (23 Francophone Africans, 12 Finns, and 24 from other language backgrounds; ages 18-35), who all functioned at a high level in two languages (Cook 1994). The concern that prompted the survey was to improve upon definitions of bilingualism which do not typically take into account internal or *private* functions of the two languages, such as self-organization (e.g., making appointments and shopping lists), mental calculations (e.g., counting things and adding up numbers), memory tasks (e.g., remembering phone numbers, travel routes, days of the week, and historical dates), unconscious uses (e.g., talking to oneself and dreaming), praying, and display of emotions (e.g., feeling happy, sad, tired, pained, or frustrated).

The results showed prayer to be the activity that drew the largest concentration of reported L1 use—60% (with 20% indicating use of both languages and 20% use of just the L2). The next highest reported use of L1, 55%, was for mental calculations, while 17% reported using both L1 and L2, and 28% reported using just the L2. Unconscious uses was next with 49% of the L1, 38% of both L1 and L2, and 13% use of the L2. For memory tasks, 48% reported using the L1, 23% reported using both languages, and 29% indicated use of the L2. Finally, 44% of the respondents indicated displaying their emotions primarily in their L1, 39% in both, and 17% in their L1. This study constitutes one of the only attempts to determine the extent to which bilinguals use their two languages for such private functions. It also needs to be pointed out that the results of such a survey will vary according to the demographics of the given sample.

[3]The phrase *diglossic thinking* is derived from the notion of diglossia wherein there are two co-existing languages or language varieties in a community, each with its own purposes (Ferguson 1959).

While this survey gives a broad report of the language of thought for selected activities, there is a need for more such surveys along with the details of actual experiences. For example, the survey would suggest that about half of those sampled preferred to think emotionally-charged thoughts in their L1. Ten years of participation in a support group in Israel provided me with some insights that would corroborate this finding. The support group averaged ten members, of whom some four were native speakers of Hebrew and six were native speakers of English, although all were fluent in both languages. In situations where there was a need to communicate on highly sensitive, emotional matters, the participants appeared to be thinking about issues primarily in their L1[4] and almost invariably communicated their thoughts in the L1.

Although probably less common, there may also arise instances where nonnative speakers may wish to distance themselves from their message by thinking and talking about it in the LT precisely so that it does not have the same emotional impact. A colleague related to me that while a college student of German used English when she thought to herself about her having been a rape victim, she was only willing to share the details of this ordeal with others in the foreign language, German. Presumably, some, if not many, of her thoughts about this traumatic experience were in German, at least at the point when she externalized them for her listeners. Hence, she was distancing herself from the event.

* * *

In an effort to explore the factors influencing language of thought and the role of LT thinking in improving language ability, two methods of data gathering were employed. First, a short questionnaire was constructed (see Appendix) and disseminated in December of 1993 to graduate students in a University of Minnesota second-language teaching methods course and to ESL teachers at the Minnesota English Center. Completed questionnaires were obtained from seventeen anonymous respondents, of whom thirteen were English native speakers, two were native speakers of Japanese, one a native Turkish speaker, and one a native Hungarian speaker. While three of these were bilingual, all the others were multilingual--eight being trilingual, four quadrilingual,[5] one quintilingual, and one sextilingual.

Second, since it was largely through my experiences in studying twelve languages and continuing to use seven of them that prompted this paper, I decided to draw on some of my own multilingual thinking experiences as a source of data. I lived for sixteen years in a Hebrew- and Arabic- speaking community, two years in an Aymara-speaking community within the

[4] This observation was not empirically verified however, such as through retrospective verbal report.

[5] One of whom had studied four other languages as well.

Spanish-speaking world, a year and a half in a Portuguese-speaking country, and four months in a French-speaking environment.

The following discussion of language of thought and the contribution of LT thinking to language learning will draw on selected responses from the mini-survey and from the experiences of the author.

Factors Influencing Language of Thought

There would appear to be a number of factors which determine which language(s) people think in at a given moment. Some of these are accidental while others are more planned. Let us now look at both unplanned and planned uses of languages for thought.

Unplanned Uses of Language(s) for Thought

Learners may find themselves thinking in a language and actually be surprised by this realization. Sometimes the switch is triggered by a memory about people or situations, as two respondents indicated:

> English-L1 trilingual: Sometimes when something triggers a memory of being abroad where I spoke an L2 (i.e., Guatemala, Poland, etc.), I think in the language I used at the time, especially if the memory involves conversations or encounters with native speakers in those places.

> English-L1 quadrilingual: I think in Hebrew, French, or German when I'm thinking about people who speak those languages or situations in which I used those languages.

Another unintentional switch takes place when speakers want to speak in the L3 but thoughts come to them in their L2, a language in which they are more proficient:

> Hungarian-L1 trilingual: It often happens to me when I try to speak in my L3 [German] that I find myself thinking in my L2 [English]--as if my brain knew that it should be a foreign language, but words come to me in the foreign language that I'm more proficient in.

One of the respondents from the survey, an English-L1 trilingual, described a somewhat frustrating but not atypical experience in multilingual thought in a language class he once took:

> I studied Spanish in Sweden as an exchange student. A question would be posed in Swedish with the goal of a reply in Spanish, but in my head it went Swedish English Swedish, as if I were speaking "foreign"--that is, any language other than English was "foreign." It was very confusing for the instructor, and I often wouldn't know which language I had produced in.

The above respondent was thus describing a recurring situation in which he was reprocessing the teacher's Swedish-L2 input into English-L1 and

then instead of responding in Spanish-L3 as he wished, the thoughts and subsequent utterances would sometimes emerge in Swedish, almost involuntarily. In other words, his mind would go into a "foreign language" mode and what would appear would be the dominant foreign language rather than the target one.

The English-L1 sextilingual indicated shifts back to the L1 from a second or foreign language because of language inadequacy, as well as noting a fascinating pattern of repeatedly shifting to the L6 in dreams:

> I often have thoughts that begin in a second language but end in my L1 because of language inadequacy. I also have thoughts that begin in a second language and switch to L1 when I remember that I can use the L1 for the interaction I am anticipating. I'm used to living in a non-English environment. I have had dreams where I am attempting to talk to someone in my L3 but keep lapsing into my L6.

When my wife, two children (ages 13 and 9), and I lived in São Paulo, Brazil, from 1986 to 1987, English was the language of the family at home, Hebrew the family language on the streets (for security reasons), and Portuguese the language that I used at work in the university. It was not a strictly triglossic situation in that while conducting classes and meeting with students in Portuguese, I continued to use English at work for my own research purposes. Also, we would use Portuguese on the streets with Brazilian friends and sometimes used English as well. Given this multilingual environment, I noticed that I would inadvertently have trilingual thoughts--beginning them, say, in Portuguese, continuing them in Hebrew, and ending them in English. When I would become aware of this, it would usually amuse me. I remember attributing that phenomenon to the fact that I was using all three languages frequently and in highly contiguous situations, but I never analyzed just where the shift took place (i.e., if there was some trigger word or phrase [Clyne 1980] that induced it).

Planned Choice of Language(s) of Thought

Whereas multilinguals may well find themselves thinking in a given language without having consciously chosen to do so, at other times language learners may purposely use the LT as the language of thought. While the learner may not be able to control the language in which some of their thoughts appear, they may still be able to plan their thinking in the language on numerous occasions. Let us look at some of these planned choices.

Warm up: "Din in the Head"

A language learner may choose to think in an LT for the purpose of rehearsal--to warm up or to enhance the "din in the head" (Krashen 1985) for that language. Here is an example from the mini-survey:

English-L1 trilingual: Yes--I planned what I would say and prepared for various scenarios ahead of time in a language—thinking of what words I would use and how to express myself in a situation. It was very helpful and after a few months, I gave it up because I no longer needed to rehearse.

Depending on how well the language is known, carrying on an imaginary conversation in the mind or planning for such a conversation may contribute to more successful oral communication. By the same token, reading bits and pieces of a newspaper in the target language or doing a little unmonitored speed writing may constitute useful warm ups to subsequent reading and writing efforts respectively. The amount of time needed for a warm up will vary according to the learners' proficiency in that language and the recency of last contact with it.

Thinking through the L1 or an LO in Learning the LT

Learners may think in their L1 or an LO (see the examples from the trilingual and the sextilingual below) in order to learn some formal rule of grammar in the LT. In fact, they may only attempt to think in the LT itself when the intent is to use the language in free conversation, and perform all metalinguistic tasks in the L1. Probably any such depiction of reality would be problematic since humans do not categorize their behavior so neatly. Rather, some of a learner's metalinguistic thoughts would be through the LT, depending on the learners and the type of task (e.g., when formal learning takes place in the LT), and many of their thoughts during language use would be through their L1. Learners may not, however, think complex (e.g., metalinguistic) thoughts through the LT at all, but rather may make passing reference to the LT in the form of fleeting or limited thoughts. So, the question is whether the LT actually serves as a language of thought or as a language of reference (Richard Kern, personal communication, January 12, 1994). So, this brings us back to the question raised at the outset concerning what constitutes "thinking in the LT."

Multilingual learners may also consciously draw material from several LOs while learning an LT. For example, in devising mnemonic devices for remembering LT words, learners may choose to use words or expressions from an LO. So, for example, when I was learning Hebrew, I usually generated mnemonic keywords from English but occasionally from Spanish. Thus, when I wanted to remember the Hebrew word **arbolet** 'whirlpool,' I used the Spanish keyword **árbol**, and created an image of a dead tree caught in a whirlpool.

Likewise, multilingual language learners may choose to think at times or even extensively in one of their LOs while learning the given LT. This LO may be closer to the target language in structure and vocabulary than is the L1. Again using myself as an example, as a native speaker of English, I learned L4 (Spanish) by thinking primarily in my L3 (French); I learned my L5 (Aymara), L6 (Portuguese), and L11 (Italian) by thinking

extensively in my L4 (Spanish); and I learned my L8 (spoken Arabic) by thinking most of the time in my L7 (Hebrew). When I speak these languages I often still think—at least to some extent—in the language that I used as a language of thought during the learning process.

In learning spoken Arabic, I was in a class with Hebrew speakers and the vocabulary was glossed in Hebrew. The system for writing the spoken Arabic involved the use of a transliteration using Hebrew letters (written from right to left). When I speak Arabic today, I think partly in Hebrew (as Arabic and Hebrew share common words and grammatical structures) and partly in English. Interestingly enough, I call up an English transliteration (from left to right) in my mind even though I learned through Hebrew transliteration. The mnemonics that I used to learn Arabic vocabulary mostly involved both English and Hebrew key words and phrases (e.g., English mnemonic keyword for the Arabic word **ebtihan** 'exam' "empty handed"—"he went into the exam empty handed").

With regard to the experiences of the seventeen respondents surveyed, none indicated that they used a global strategy of thinking through an LO, as I had done systematically in the learning of five languages. However, several indicated the use of the LO in the learning of LT grammatical structures:

> Turkish-L1 trilingual: The grammar of my L3 (English) is more similar to my L2 (German) than my L1 (Turkish). When I was learning English I was comparing it to German rather than to Turkish.
>
> English-L1 sextilingual: I guess when I learned Spanish I compared verb conjugations to French, which I had studied previously, because person, tense, and gender matched better than comparing to English.
>
> English-L1 quadrilingual: When I studied Russian and Farsi, I relied on my knowledge of the verb conjugation paradigms from the Romance languages I had studied. I found many phonological similarities which helped me to remember subject pronouns and verb endings. My knowledge of German helped me be more open to the concept of the case systems in Russian.

One respondent did indicate frequent interlingual comparisons for the purpose of practicing the different languages:

> English-L1 quadrilingual: I do this all the time, for the purpose of practicing my other languages. I'll take an English thought, and ask myself, "How would I say this in Spanish, or Ukrainian?" Then, additionally, I might ask myself, "Which language seems to express that idea, or that thought, or feeling the best?"

The Role of LT Thinking in Improving Language Ability

While researchers in the field of language learning have begun to investigate the strategies that learners use to succeed at LT learning (O'Malley & Chamot 1990, Cohen 1990), the issue of the language of thought has not received much attention in the language learning strategy literature. As mentioned at the outset, there is an intuitively-based assumption that it is beneficial for foreign language learners to think as much as possible through the language that they are learning. This assumption has been at the core of certain foreign language learning methods that have avoided the use of the learner's L1, at least during the initial phase of instruction--methods such as the Silent Way, Total Physical Response, and the Natural Approach.

With regard to the Silent Way, Gattegno expressed his position as follows:

> Throughout our oral work with the rods and the visual dictation on the charts, we have carefully avoided the use of the students' native languages. We have even succeeded in blocking them so that the students relate to the new language directly. . . (Gattegno 1976, p. 99)

Asher (1977) described his Total Physical Response method as follows:

> Understanding should be developed through movements of the student's body. (p. 4)
>
> When you cast material in the imperative, there is no translation. (p. 20)

Krashen and Terrell (1983) stipulated the following with regard to the Natural Approach:

> (1) the instructor always uses the target language, (2) the focus of the communication will be on a topic of interest for the student, (3) the instructor will strive at all times to help the student understand. (p. 20)

In methods such as these three, teachers implicitly or explicitly discourage students from translating, and the learners themselves may come to feel that L1 or LO thinking could be detrimental to the learning process. The argument is that by thinking in the target language, learners are increasing their chances of becoming idiomatically accurate in that language—that they are more likely to stop and ask themselves, "Now how would a native say or write that utterance?" The assumption behind the "don't

translate" philosophy is that it will lead to greater success at language learning.

The University of Minnesota mini-survey on the language of thought asked students whether they were admonished by their teachers to think through the LT in their language learning experiences. Fifty percent of the respondents in the mini-survey indicated that they were:

> English-L1 trilingual: I was taught early on to do this--at first it took more conscious effort, but now it sometimes "just happens."
>
> English-L1 trilingual: The teachers always encouraged us to stop translating and start thinking in the L2.
>
> Chinese-L1 bilingual: She pushed to think in the L2. I remember feeling saturated by all of the pushing she did in the L2.
>
> Turkish-L1 trilingual: Often. My first German teacher encouraged us to think in German and to avoid translating into our native languages.
>
> Japanese-L1 trilingual: I went to a school of English in Japan, where English was the only means of communication. "Think in English" was the school's motto or philosophy.
>
> Hungarian-L1 trilingual: I have always been encouraged to try to think in the foreign language I'm learning, but I've found that it's much easier to do at a higher proficiency level than at lower levels.

When asked whether they themselves made an effort to think extensively through the target language, 82% (14) indicated that they did. As to the results it produced, most indicated benefits. The first set of responses referred directly to situations of submersion in a context where the language was spoken natively:

> English-L1 trilingual: Living over there [in France] for 4+ years with few "English" contacts made that quite easy.
>
> English-L1 bilingual: Yes--I consciously pushed myself to think in my L2 while I lived in China. The results were quite good, especially since I did a lot of communicating with other L2 learners in Chinese. The more we practiced the language and thinking in the language, the better our communicative competence and linguistic competence.
>
> English-L1 trilingual: Yes, [the results of submersion were] pretty successful. After a year of living in Mexico, I seldom had to think of a word in English before putting my thoughts into Spanish.
>
> English-L1 quadrilingual: During a time living in France I took a course in speed-reading. Since what I was reading was French, I eventually got to the point where I really read in French--despite lack of oral practice. I continue to read French fast and always in French.

Japanese-L1 bilingual: I tried to think in English when I was studying the language in Japan. But it just didn't work. (I can do it quite easily now [after coming to the U.S. to study].) I think one needs to immerse in the LT culture for some time before she becomes able to think in the LT.

Turkish-L1 trilingual [living in the U.S. for some years]: Not as much in German [L2]. I seldom think in Turkish now. I am much more at home in English [L3] than I ever was in German.

The next set of responses regarding the extent of LT thought are of a more general nature, not referring specifically to submersion in the language and culture:

English-L1 trilingual: I find that when I do make the effort to make internal dialogue in L2, it makes it easier to speak without as much hesitation.

English-L1 quadrilingual: Always--I am successful. I talk to myself in LTs, describing even simple things.

English-L1 quintilingual: It seems to aid reading comprehension and oral communication when I try to think in the LT system.

English-L1 quadrilingual: The first year I studied Spanish, I practiced translating my thoughts from English to Spanish all the time--at work, play, walking around, etc. I believe it served to ingrain my knowledge immensely. I considered it "studying any time, any place, without even sitting down and opening my book."

English-L1 sextilingual: Yes. My language ability improved. I communicated more and better. I began to automatically think in the second language and to rehearse mentally what to say in various situations I encountered or anticipated.

English-L1 trilingual: Yes, I can exist in Swedish--and I do not know many telephone numbers of my Swedish friends in English. I have to write them out and translate if I give them, for example, to an international operator.

English-L1 trilingual: If you can do it, it always pays off.

Only two of the respondents had a somewhat negative response to the question about whether they used LT thought extensively:

Japanese-L1 trilingual: Yes, but I guess that I tended to get exhausted at a particular point in the process of thinking. Also I seemed to be thinking more slowly. (Thus, I was more frustrated.)

English-L1 bilingual: Not usually, unless I'm also speaking or reading in German.

So, the conclusion that one might reach after reviewing the responses from the mini-survey and from my own examples is that there are definite benefits from making an effort to think in the LT. The issue at hand is what

such "thinking in the LT" really means and how to do it most effectively. Just as Kern questions the extent to which the LT is actually a language of thought as opposed to a language of reference, so Lantolf (personal communication, May 13, 1994) contends that when nonnatives plan and rehearse what they want to say subvocally in an LT (as some of the respondents reported doing above), this does not really constitute thinking in the LT; likewise, Lantolf sees this activity more as thinking about the LT. In other words, the fact that the speakers have to engage in such activity might suggest that they cannot think in the LT. Of course, if they are rehearsing the LT material and also thinking about it in the LT at the same time, then perhaps this would more directly constitute thinking in the LT.

Once we have all of these various distinctions sorted out and arrive at a good working definition of what we mean by thinking through the LT, then it will be beneficial to conduct a series of studies assessing the effects of both qualitative and quantitative differences in the amount of LT thought on outcomes at various stages in the learning process.

Additional Empirical Data on the Language of Thought

A Study of Mental Translation in Reading

As noted at the outset, Kern (1994) has recently conducted empirical research which provides new insights into the language of thought for comprehending foreign language texts. The researcher explored the actual uses for translation into the L1 in the language learning/using process. He had 51 students of intermediate-level college French (in high, medium, and low reading ability groups) participate in verbal report interviews while reading French texts at the beginning and the end of a fifteen-week semester. An analysis of the verbal report data provided a series of reasons for why the learners of French as a foreign language chose to perform mental translation into their L1, English. The study provided a number of insights as to why LT learners may well choose to think through their L1 or an LO instead:

1. By so doing, the learners have an easier time processing the thought since L1 or LO processing facilitates semantic processing. For example, learners may have a more difficult time chunking LT lexical items into semantic clusters than they do with translated items. If the learners stay only in the LT, they are more likely to store words as discrete units in working memory, which in turn places a greater burden on memory capacity.

2. If learners process the input exclusively in the LT, they run the risk of losing their train of thought as soon as the chunks are long or syntactically complex, since such chunks are harder to hold in short-term memory. Indulging in mental translation during LT aural comprehension or reading, on the other hand, is likely to allow the learner to represent in a familiar, memory-efficient form, portions of the oral or written LT text that exceed cognitive limits. Translation then serves as a means of maintaining concentration long enough for meaning to be integrated and assimilated.

3. By thinking in the L1 or an LO, the concepts are likely to come alive because the learners' network of associations is usually richer than in the target language. The semantic potency of words may simply be less in the LT than in the L1 or an LO.

4. Thinking in the L1 or an LO converts the input into more familiar, user-friendly terms, enhancing the learners' confidence about their ability to comprehend it. This may serve as an affective boost, reducing the insecurity they may feel.

5. Learners may also revert to the L1 or an LO because they have found that it helps them in clarifying syntactic roles, verifying a verb tense, or checking for comprehension (Kern, 1994).

The fact that learners resort somewhat or extensively to the use of the L1 or an LO does not necessarily mean that translation works to the learner's advantage. For example:

1. Attempts at translation may be inaccurate, leading to miscomprehension.

2. Translations done too much on a word-by-word basis at the micro-level may not adequately provide for integration of meaning. Hence, the learner may come away with a bottom-up sense of how portions of text and isolated items function and what they mean, without having an overall, top-down sense of what the material is all about.

3. Learners who are translating during language processing may be attending to LT forms only very briefly and reserving the bulk of meaning processing for the L1 mental representation. In other words, it is possible that during much of the meaning-integration process, learners focus primarily on transformed L1 representations rather than on the original LT forms. Furthermore, some or much of the thought that goes on during mental translation may be of a technical or perfunctory nature--e.g., searching for literal equivalents of LT forms, rather than determining the general coherence of the text. In an extreme case, the LT input may make little impact on the learners' knowledge of the LT forms. It is more likely that while such a language comprehension strategy would diminish the likelihood of LT learning, some learning would nonetheless take place.

Studies of L2 Writing by Means of Translation

While Kern's study focused on mental translation for the purpose of comprehending text during reading, studies have also begun to look at the effects of translation from L1 on the production of foreign language writing. A study by Paivio and Lambert (1981), for example, found that the translation of individual words called for deeper language processing than simply copying down the foreign language synonymous word or phrase, and that this act of translation helped to fix the words more solidly in long-term memory.

At the text level, a study of EFL composition writing was conducted with 48 Japanese university students who were at the low-intermediate to low-advanced levels and who had all had four years of university

(Kobayashi & Rinnert 1992). Choosing from among four topics, one group wrote the first essay in Japanese L1 and then translated into the foreign language, English, while a second group wrote directly in English first. The next day the groups reversed tasks and wrote their second essay on another topic.

The results showed that the translations were rated higher (in content and style) than were the essays written directly in English, the foreign language. In terms of content, organization, and style, lower-level writers benefited from translation whereas higher-level writers did not. Syntactic complexity was found to be greater in the translations. When the students were asked for their writing preference, 77% reported preferring direct composition to translation. They based their view on the difficulty of conveying subtle nuances of meaning when translating, and on the tendency to use familiar words and structures and simpler ideas when writing directly. In addition, several indicated preferring the direct approach because they wanted to think in English.

As for the advantages of translating, ideas were easier to develop, thoughts and opinions could be expressed more clearly, and words could be more easily found through the use of a dictionary. The students reported being able to think more deeply in their native language and better express their thoughts and opinions. Translating was also viewed by some as helping in vocabulary acquisition.

The investigators asked for retrospective self-reports from the students as to "how much Japanese they thought they were using in their minds while they were writing directly in English." Since 55% of the higher-proficiency students and 87% of the lower-proficiency students reported using Japanese half the time or more when supposedly writing directly in English, the *direct writing* treatment was actually somewhat less direct than the label would imply.

Another study of foreign language writing through translation was conducted by Brooks (1993). She compared two methods of producing French compositions among intermediate college French students: writing and revising a draft in English and then translating the finished version into French vs. conducting the entire process in French. She found that out of 31 students, seventeen were rated better on their translated essay than on the one they wrote directly in French. Twelve students received a higher rating for the essay that they wrote directly in French, and two had identical scores. In this study, the students were not asked to report on the extent to which they thought in the L1 while composing directly in the foreign language, French.

Studies such as these two, by Kobayashi and Rinnert (1992) and by Brooks (1993), would lead to speculation that for a percentage of intermediate nonnative writers, writing directly may actually constitute a lowering of a standard that can be set by writing first in the native language and then translating. Contrary to popular belief, the attempt to think directly

through the LT may actually detract from the production of good writing. If so, this would be an indication of a way in which thinking in the L1 can actually support the production of foreign language despite the admonition that such cognitive behavior encourages negative transfer and is thus counter-productive.

An Anecdote from the Culver City Spanish Immersion Program

Immersion programs pride themselves on producing a more natural, enduring form of bilingualism than do more limited programs which simply teach foreign languages as a subject (e.g., FLES). The Culver City Spanish Immersion Program--the first full-immersion program in the U.S.--represents one of the most conscientious efforts to stick strictly to the target language for academic subjects and for social interaction over the early grades. During the first decade or two of the program, the teachers made it a point of sticking to their foreign-language guise and never spoke English. They even pretended not to be able to, although they made it clear that they understood all that was said by students in English.

I recently had an opportunity to spend extended time with one of the students in the first class to go through the Culver City Spanish Immersion Program (starting kindergarten in 1971), and to speak Spanish with her. The information that she shared with me and actual insights from her efforts at using Spanish during that meeting underscored for me the need to conduct systematic research regarding the language of thought in such programs. After several years in France and no continued use of Spanish, the former immersion student's Spanish was "rusty." She understood most everything but spoke it only haltingly. What was interesting was that she spoke it with a near-native accent and that she reported thinking directly in Spanish when she spoke it.

When she wanted to order a turkey sandwich in Spanish at a Subway restaurant (the attendant was Mexican-American), she could not remember **pavo** "turkey," but instead of thinking, "How do you say turkey in Spanish?" she thought, "**No es 'pollo.' ¿Cómo se dice?**" ("It's not 'chicken.' How do you say it?") In other words, her thoughts were in a Spanish inner speech. She reported that when she spoke in French after having lived in France for several years, she would often think in English first. As she put it, "'Glass' is **verre**, while in Spanish the word **vaso** just comes right out directly."

While the former immersion student was confident that her early start with Spanish made it easier for her to learn French and to learn it well, in some ways she did not and perhaps could not learn French as "deeply" as she had learned Spanish. Thus, it appears that Spanish had special status in her mind, although considerable language attrition had taken place. Cognitive psychologists have long maintained that the durability of memory traces depends on the depth of processing, or the degree of analysis afforded the material in question during the various moments or stages in the input process (Craik & Lockhart 1972, Craik 1977). It would seem

that getting an early start on language acquisition through early full immersion and participating in such a program that is rich in repeated exposures to the language would help to enhance or deepen the learning.

It may be of benefit to follow up on this anecdote by determining whether this "deep processing" phenomenon is shared by other immersion students who later became fluent in another language. If so, then perhaps it says something about the quality of the language learning experience in early immersion.

Findings from a Recent Study of Spanish Immersion Learners

While it is often presumed that immersion program pupils come to think through the target language while performing school tasks, the learners may actually be thinking largely through their native language or another language. For example, a study was conducted with 32 Spanish immersion pupils selected from third through sixth grade at a full-immersion school in St. Paul. A team of five investigators collected verbal report and observational data from the pupils over a five-month period (Cohen 1994; Parker, Heitzman, Fjerstad, Babbs, & Cohen in press; Heitzman 1994).

The study was designed to examine the nature of the internal language environment that emerges in learners as a result of the specific external language environment established in immersion classrooms. *External language environment* was defined as all language-related elements that influenced the learner from without, namely, curriculum goals, classroom policies and procedures, classroom materials and activities, and communicative exchanges between students, teachers, and administrators. The *internal language environment* referred to how learners processed language in their minds--that is, their native- and second-language systems and the role played by each in performing the cognitive tasks for which the second language was a vehicle.

The findings revealed that for the immersion students under study English seemed at times to play a more prominent role in their internal language environment than did Spanish. In responding to both numerical and verbal problems in math, students reported favoring English in their cognitive processing and were also observed to be doing so. They read the problem in Spanish but would shift to English immediately or as soon as they had some conceptual difficulty.

Thus, it appeared that the pupils in the St. Paul immersion program were reverting to English for much of their cognitive processing--performing rapid, online translation or reprocessing when needed (Cohen 1994; Parker, Heitzman, Fjerstad, Babbs, & Cohen in press; Heitzman 1994). This finding may be interpreted in both a negative and a positive light. On the minus side, online reprocessing into the L1 may help to suggest why the immersion pupils were not as fluent in Spanish as might have been expected after so many years of daily exposure to it in the classroom. On the plus side, there may well be advantages of a cognitive nature stemming from skillful two-language "translation-bouncing" (Wallace

Lambert, personal communication, January 14, 1994). Skillful translation would mean doing it so swiftly and successfully that no one could call it a crutch and few would even be aware that it is going on. The assumption, of course, is that the pupils can bounce back--that is, perform two-way translation with ease. Immersion programs may well have this feature of promoting flexibility in simultaneous translation, but the extent to which it is a two-way skill needs to be investigated.

Multilingual Thought Processes in Producing an Utterance

The research literature is all but devoid of systematic research on the language(s) that multilinguals actually do their thinking in from moment to moment. There is a considerable amount on the languages speakers use for given interactions, but virtually nothing on the thoughts leading up to those utterances. Cohen and Olshtain (1993) began to investigate this issue by asking respondents to view videotaped footage of themselves performing speech acts in role play situations in English as a foreign language, and to reconstruct the choice of language for the planning of the utterances.

Looking at the total group of fifteen respondents performing six role plays each, the three most common patterns were "planning in English and responding in English" (21 instances across 9 speakers), "planning in Hebrew and translating from Hebrew to English in the response" (17 instances across 7 speakers), and "planning in Hebrew with the response in English" (16 instances across 8 speakers). There were actually 16 other patterns. Hence, response patterns were complex, and further such research would seem warranted.

While investigating the selection of particular speech styles in the LT, Cohen and Olshtain found that multilinguals who may function largely through an LO while learning and using the LT, may revert to their L1 to determine the appropriate style for a given utterance. This is what a native French speaker reported after role playing a situation of asking his teacher for a lift home. He indicated that he thought the utterance through in French (the L1) first because he was aware it called for deference to status. He then translated the utterance into Hebrew (the LO), and finally produced what he felt would be an appropriate English (L3) equivalent of that utterance (Cohen & Olshtain 1993).

Conclusions

This paper has asked more questions than it has answered. Since inner speech is by its very nature "inner," it is difficult to describe the extent to which a multilingual's various languages might play a role in it. For this reason, a brief comment about research methodology seems in order. Perhaps the most viable means of collecting such data is through verbal report, as seen in the several studies reported above (Kern 1994; Cohen 1994, Heitzman 1994, Parker et al., in press; Cohen & Olshtain 1993). Such ver-

bal reports would include data that reflect self-report (learners' descriptions of what they do, characterized by generalized statements about their language behavior), self-observation (the inspection of specific, not generalized language behavior introspectively--i.e., within 20 seconds--or retrospectively), self-revelation (think-aloud, stream-of-consciousness disclosure of thought processes while the information is being attended to), or some combination of these (Cohen 1987, Cohen & Hosenfeld 1981, Radford 1974).

Critics of verbal report methods note that much of cognitive processing is inaccessible because it is unconscious (see, for example, Seliger 1983). Even if the processing is not unconscious, it has been considered either as too complex to capture in protocols (Dobrin 1986), or as putting too great a burden on the learners' memory for them to report mental processing with any accuracy. Thus, researchers who use such measures either have to somehow raise the level of conscious awareness of processing or make do with insights regarding those processes to which respondents have conscious access. The use of such measures may also require of respondents that they unravel some of the complexity inherent in a given set of cognitive processes and/or improve their recall skills.

Verbal report techniques are also criticized for their potentially intrusive effect. For example, in reading research, attention is drawn to the possibility that immediate retrospection may distort the process of reading if the readers read more closely than normal, read sentence by sentence, or concentrate on the additional cognitive and metacognitive task (Mann 1982). Not only is there the possibility that the verbal report task may cause reactive effects, and thus produce data no longer reflecting the processes intended to be investigated; there is also the possibility that the results will vary according to the type of instructions given, the characteristics of the participating subjects (some more informative than others), the types of material used in collecting protocols, and the nature of the data analysis (Olson, Duffy, & Mack 1984).

Despite the numerous criticisms that have been raised, research has demonstrated that verbal reports, elicited with care and interpreted with full understanding of the circumstances under which they were obtained, are, in fact, a valuable and a thoroughly reliable source of information about cognitive processes (Ericsson & Simon 1980, 1993). Whereas the neurological origin of cognitive processes may not be available for inspection, the cognitive events themselves are available through verbal report (Steinberg 1986: 699). It is suggested that language learners underestimate the extent of conscious (or potentially conscious) processing because they are not attending to it. Furthermore, the directness of introspection gives it a character not found in any other investigation of psychological phenomena (Bakan 1954).

In a recent study by Nyhus (1994), seven college ESL students read a sociology text and provided think-aloud protocols in English as they read, as well as retrospective verbal report while they listened to the tape-re-

cording of themselves thinking aloud. They also responded to questions regarding their attitudes toward the research methodology of verbal report itself. Respondents were found to view most of the effects they attributed to verbal report as beneficial. For the most part, they felt that think-aloud verbal report affected their thinking about their reading in a positive way. It was reported to enhance their awareness of themselves as readers and of their interaction with the text. The two students who had some negative comments about the verbal report, which was conducted in English, were those with more limited English. Respondents viewed verbal report as useful as both a diagnostic tool and as a study technique. They felt that doing it in pairs or in a group allow them to realize alternative ways of thinking about a text.

Hence, the challenge is to refine the methods for describing the language of thought of multilinguals--to investigate where possible through verbal report and other methods the differential uses of the languages in thinking. Undoubtedly there is much that will not be accessible to description, but the field can benefit greatly from more insights regarding what can be described. It could be of interest to determine the extent to which multilinguals **think** in mixed codes, just as certain multilinguals may **speak** in mixed codes, and also to determine the effects that such language behavior has on the outcomes.

Just as it is valuable to sort out the issues of multilingual thinking and inner speech from a psycholinguistic perspective, there is a commensurate need to explore more fully the sociolinguistic dynamic of inner speech. How do adult multilinguals think through issues in different discourse domains? How do children in language immersion programs do the same? It would appear that knowledge regarding these phenomena could help inform foreign language teaching and in content-based instruction delivered through a second or foreign language. It would, for example, be possible to generate a grid of the context/content of data collected from the sample through verbal report. The grid could indicate the nature of the content, the context or discourse domain it belongs to, and the extent to which the thoughts involved one of a series of categories as in Cook's (1994) survey—e.g., memory tasks, mental calculations, display of emotion, and so forth.

While we only looked at a limited data set regarding the effects of extensive target language thought during language learning, the evidence seems to suggest that the effects are positive. All the same, the appropriate role of a paper such as this one may simply be to define a possible research area and to encourage applied linguists to explore it before making pronouncements about which course of action is preferable with regard to foreign language teaching methodology. Ultimately there may emerge a set of guidelines for learners as to the advantages and disadvantages of thinking through the native language while performing target language

tasks. Such guidelines may even be specified according to learning style, stage in the learning process, and so forth. At present we can only speculate about these matters until more research data such as those collected by Kern (1994) are amassed.

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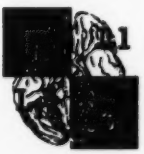

Appendix

In Which Language Do/Should Multilinguals Think?

1. a. Did you ever find yourself thinking in some language without intending to? Describe the situation.
   b. Do you then purposely switch your thoughts to another language? If so, why?

2. Have you ever had multilingual thoughts—i.e., thoughts that begin in one language, continue in another, and possibly end in a third? Describe.

3. a. Have you ever chosen to think through a second language for the purposes of learning a third language (e.g., because the L2 was closer to the target language than your native language, such as in learning Portuguese through Spanish rather than through English)? Please describe the situation.
   b. If the answer is "yes," to what extent do you continue to think through that L2 when you use your L3 today? Please explain.

4. a. During your L2 learning experiences, have you ever been admonished by your teacher to think through that target language? Describe.
   b. Have you made an effort to think extensively through the target language? If so, with what results?

5. a. When you are reading in an L2, to what extent do you find L1 or L3 glosses/translations for words you don't know? Explain.
   b. To what extent do you gloss words by means of an L2-L2 dictionary?
   c. Think of an L2 you have contact with at present. To what extent do you just read without going to a dictionary? Explain.
   d. How well does this work?